

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE  
ON HYPERTENSIVE PATIENT IN A TERTIARY CARE  
HOSPITAL.**

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## **ABBREVIATIONS**

ACEI-	Angiotensin Converting Enzyme Inhibitor
ACTH-	Adreno Cortico Trophic Hormone
ADH-	Anti Diuretic Hormone
ADR-	Adverse Drug Reaction
AHA-	American Heart Association
ALT-	Alkaline aminotransferase
ANP-	Anti Natriuretic Peptide
ARBS-	Angiotensin Receptor Blockers
AST-	Aspartate aminotransferase
AV-	Arteriovenous
BPM-	Beats Per Minute
BP-	Blood Pressure
BB-	Beta Blockers
CAD-	Coronary Artery Disease
CCB-	Calcium Channel Blocker
CHF-	Congestive Heart Failure
CKD-	Chronic Kidney Disease
CO-	Cardiac Output

CVA-	Cerebrovascular Accident
FDC-	Fixed Dose Combination
IHD-	Ischemic Heart Disease
JNC-	Joint National Committee
LVH-	Left Ventricular Hypertrophy
MI-	Myocardial Infraction
NSAID-	Non Steroidal Anti Inflammatory Drugs
NO-	Nitric Oxide
OTC-	Over The Counter
PAD-	Peripheral Vascular Disease
TIA-	Transient Ischemic Attack
TPR-	Total Peripheral Resistance

## INTRODUCTION

Now a day's healthy world, the term silent killer that suit rightly to Hypertension, because of its nature. And it is the important public challenge in the world due to its high prevalence and strong association with cardiovascular disease and premature death. Hypertension is blood pressure elevated enough to perfuse tissues and organs. Elevated systemic blood pressure usually defined as a systolic reading  $\geq 140$  mmHg and a diastolic blood pressure  $\geq 90$  mmHg.<sup>[1]</sup> It is one of the most important risk factor for both coronary artery disease, cerebrovascular and renal disease.<sup>[2]</sup>

According to seventh report of joint national committee on the Detection Evaluation and treatment of high blood pressure hypertension has 4 stages and it is illustrated as follows<sup>[4]</sup>

**Table No: 1 JNC VII classification of Hypertension**

<b>Classification</b>	<b>Systolic hypertension</b>	<b>Diastolic hypertension</b>
Normal	120 mmHg	80 mmHg
Pre hypertension	120-139 mmHg	80-89 mmHg
Stage 1	140-159 mmHg	90-99 mmHg
Stage 2	$\geq 160$ mmHg	$\geq 100$ mmHg

## EPIDEMIOLOGY

It is estimated that approximately 30% of the population (50 million Americans) has high BP ( $\geq 140/90$  mm Hg) estimates from the National Health and Nutrition Examination Survey from 1999–2000 indicate that the prevalence is 30.1%

and 27.1% among men and women, respectively. This represents a significant increase of 5.6% in women from 1988 to 2000, whereas the prevalence in men has remained unchanged. Prevalence rates are highest in non-Hispanic Blacks (33.5%), followed by non-Hispanic whites (28.9%) and Mexican-Americans (20.7%).<sup>[5]</sup> BP values increase with age, and hypertension is very common in the elderly. The lifetime risk of developing hypertension among those 55 years of age and older who are normotensive is 90%. In the older population (age  $\geq$  60 years), the prevalence of hypertension is 65.4% (estimated in 2000), which is significantly higher than the 57.9% prevalence estimated in 1988.<sup>[2]</sup>

In an analysis of world wide data for global burden of hypertension 20.6% Indian men and 20.9% of Indian women were suffering from hypertension in 2005. The percentage is growing up to 22.9 and 23.6 for Indian men and women, respectively by 2025. Recent studies from India have shown the prevalence of hypertension to be 25% in urban and 10% in rural people in India.<sup>[12]</sup>

In integrated disease surveillance project in Tamil Nadu over all 9% respondents were found to have been diagnosed with hypertension by the health professional. In the urban area, the prevalence of hypertension was 10% with 9% among men and 11% among women. In rural area, 8% of hypertensive.<sup>[13]</sup>

## **SYMPTOMS OF HYPERTENSION**

High blood pressure is a common condition in which the long-term force of the blood against your artery walls is high enough that it may eventually cause health problems, such as heart disease. Blood pressure is determined both by the amount of blood your heart pumps and the amount of resistance to blood flow in

your arteries. The more blood your heart pumps and the narrower your arteries, the higher your blood pressure.

You can have high blood pressure (hypertension) for years without any symptoms. Even without symptoms, damage to blood vessels and your heart continues and can be detected. Uncontrolled high blood pressure increases your risk of serious health problems, including heart attack and stroke. High blood pressure generally develops over many years, and it affects nearly everyone eventually. Fortunately, high blood pressure can be easily detected. And once you know you have high blood pressure, you can work with your doctor to control it. Most people with high blood pressure have no signs or symptoms, even if blood pressure readings reach dangerously high levels. A few people with high blood pressure may have headaches, shortness of breath or nosebleeds, but these signs and symptoms aren't specific and usually don't occur until high blood pressure has reached a severe or life-threatening.

Hypertension is a heterogeneous medical condition. Hypertension is mainly primary and secondary.

**Primary hypertension:** In which no specific cause can be identified, constitutes greater than 90% of all cases of systemic hypertension. The average age of onset is about 35years.

Predisposing factors

- a. Family history of essential hypertension, stroke, and premature cardiac disease.
- b. Patient history of intermittent elevation of blood pressure

- c. Racial predisposition, more common in African Americans than whites
- d. Obesity
- e. Stress
- f. High dietary intake of saturated fat and sodium.
- g. Sedentary life style.

**Secondary hypertension:** Hypertension secondary to any disease and drugs

**a) Disease**

**Renal disease:**

- Acute glomerulonephritis
- Chronic renal disease
- Micro albuminuria
- Polycystic disease& Renin producing tumors
- Renal artery stenosis& vasculitis

**Endocrine disease:**

- Hyperaldosteronism
- Acromegaly &Pheochromocytoma
- Hyperthyroidism & Hypothyroidism

**Cardiovascular disease:**

- coarctation of aorta
- Myocardial infarction & Ischemic heart disease
- Left ventricular hypertrophy& Heart failure



**Neurological disease :**

- Psychogenic
- Central sleep apnea
- Increased intracranial pressure

**b) Drugs**

- NSAID, Corticosteroids
- ACTH, Estrogen
- Cyclosporine
- Antidepressant( especially Venlafaxine), Bromocriptine, Clozapine, Metoclopramide
- Clonidine  $\beta$  blocker combination
- Cyclosporine and Tacrolimus<sup>[1,2]</sup>

**PATHOPHYSIOLOGY**

The multiple mechanism of hypertension constitute aberrations of blood pressure. The blood pressure level is a complex trait that is determined by the interaction of multiple genetic environmental and demographic factors that influence 2 hemodynamic variables, cardiac output and peripheral resistance.

$$\text{Blood pressure} = \text{cardiac Output} \times \text{Total peripheral resistance}$$

**Sympathetic nervous system:** Baro receptors in the carotids and aortic arch respond to changes in blood pressure and influence the arteriolar constriction and dilation. When stimulated to constriction, that increases the heart rate and peripheral resistance, thus increasing blood pressure.

Renin Angiotensin Aldosterone System: Fall in blood pressure stimulate release of renin by kidney. Renin react with circulating substrate and angiotensinogen to produce angiotensin I. In the pulmonary endothelium is another enzyme called angiotensin converting enzyme, that convert angiotensin I to angiotensin II, potent vasoconstrictor. Angiotensin II stimulate the release of aldosterone from adrenal gland, which result in increased sodium reabsorption, fluid volume and blood pressure.

**Fluid volume regulation:** Increased fluid volume increase venous system distension and venous return, affecting cardiac output and tissue perfusion. These changes alter the vascular resistance that increase the blood pressure

Multiple factors are responsible for sustaining Hypertension. Potential defect in sodium transport, play a role in sustaining hypertension. Other factors include genetics, endothelial dysfunction and neurovascular anomalies. Other vasoactive substance involve are nitric oxide, endothelin, bradykinin, and atrial natriuretic peptide.<sup>[1]</sup>

## DIAGNOSIS

Hypertension is diagnosed by a simple test using sphygmomanometer. And it is measured at two end points, when the heart is most contracted at peak pressure (Systolic pressure) and then when the heart is most relaxed (Diastolic pressure). Elevated systemic blood pressure usually defined as a systolic reading  $\geq 140$ mmHg and a diastolic blood pressure  $\geq 90$ mmHg. According to seventh report of joint national committee on the Detection Evaluation and treatment of high blood pressure hypertension has 4 stages and it is illustrated as follows.<sup>[4]</sup>

If the clinic blood pressure is 140/90mmHg or higher than the ambulatory blood pressure monitoring conform the diagnosis of hypertension. When the ambulatory blood pressure monitoring is used then take at least two measurement per hour during the usual walking hours.<sup>[7]</sup>

### **Measurement of Blood Pressure**

Guidelines from American Heart Association define proper procedures for measuring BP. These include the following:

- Allow the patient to sit quietly for 5 minutes before measuring BP
- The patient should be seated comfortably with the back supported and the upper arm bared without constrictive clothing.
- The legs should not be crossed.
- The arm should be supported at heart level and the bladder of the cuff should encircle at least 80% of the arm circumference. Larger or smaller cuffs must be used as needed.
- The mercury column should be deflated at 2 to 3 mm/sec, and the first and last audible sounds should be taken as systolic and diastolic pressure. The column should be read to the nearest 2 mmHg
- Neither the patient nor the observer should talk during the measurement.

These measurement guidelines recommended as the standard for as the standard for measurement, but recognize that this devices are being replaced by newer technologies.

## **RISK FACTORS**

Awareness about the risk factors for hypertension is required to decrease the double burden on the society.<sup>[8]</sup>

High blood pressure has many risk factors, including:

- **Age.** The risk of high blood pressure increases as you age. Until about age 64, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65.
- **Race.** High blood pressure is particularly common among people of African heritage, often developing at an earlier age than it does in whites. Serious complications, such as stroke, heart attack and kidney failure, also are more common in people of African heritage.
- **Family history.** High blood pressure tends to run in families.
- **Being overweight or obese.** The more you weigh the more blood you need to supply oxygen and nutrients to your tissues. As the volume of blood circulated through your blood vessels increases, so does the pressure on your artery walls.
- **Not being physically active.** People who are inactive tend to have higher heart rates. The higher your heart rate, the harder your heart must work with each contraction and the stronger the force on your arteries. Lack of physical activity also increases the risk of being overweight.
- **Using tobacco.** Not only does smoking or chewing tobacco immediately raise your blood pressure temporarily, but the chemicals in tobacco can damage the

lining of your artery walls. This can cause your arteries to narrow and increase your risk of heart disease. Second hand smoke also can increase your heart disease risk.

- **Too much salt (sodium) in your diet.** Too much sodium in your diet can cause your body to retain fluid, which increases blood pressure.
- **Too little potassium in your diet.** Potassium helps balance the amount of sodium in your cells. If you don't get enough potassium in your diet or retain enough potassium, you may accumulate too much sodium in your blood.
- **Drinking too much alcohol.** Over time, heavy drinking can damage your heart. Having more than one drink a day for women and more than two drinks a day for men may affect your blood pressure.

If you drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and two drinks a day for men. One drink equals 12 ounces of beer, 5 ounces of wine or 1.5 ounces of 80-proof liquor.

- **Stress.** High levels of stress can lead to a temporary increase in blood pressure. If you try to relax by eating more, using tobacco or drinking alcohol, you may only increase problems with high blood pressure.
- **Certain chronic conditions.** Certain chronic conditions also may increase your risk of high blood pressure, such as kidney disease, diabetes and sleep apnea.

Sometimes pregnancy contributes to high blood pressure, as well.

Although high blood pressure is most common in adults, children may be at risk too. For some children, high blood pressure is caused by problems with the kidneys or heart. But for a growing number of kids, poor lifestyle habits, such as an unhealthy diet, obesity and lack of exercise, contribute to high blood pressure.

## **TREATMENT**

A large number of drugs are currently available for reducing blood pressure.

### **Classification**

- Diuretics
- Aldosterone receptor blockers
- Beta blockers
- ACE inhibitors
- ARB ( angiotensin receptor blocker)
- CCB ( calcium channel blocker)
- Alpha-1 blockers
- Central alpha-2 agonists and centrally acting drugs
- Direct vasodilators
- Rather than for two separate drugs

### **Classification**

1. Diuretics.
2. Beta adrenergic blockers.

3. Calcium channel blockers.
4. Angiotensin converting enzyme inhibitors.
5. Angiotensin receptor blockers.
6. Sympatholytics and adrenergic blockers.
7. Direct arterial vasodilators.

## **1.Diuretics**

### **Types**

- Thiazides and related diuretics.
- Loop diuretics.
- Potassium sparing diuretics.

### **Mechanism of Action**

- Initial effects: through reduction of plasma volume and cardiac output.
- Long term effect: through decrease in total peripheral vascular resistance.

### **Advantages**

- Documented reduction in cardiovascular morbidity and mortality.
- Least expensive antihypertensive drugs.
- Best drug for treatment of systolic hypertension and for hypertension in the elderly
- . • Can be combined with all other antihypertensive drugs to produce synergetic effect.

### **Side Effects**

- Metabolic effects (uncommon with small doses): hypokalemia, hypomagnesemia, hyponatremia, hyperuricemia, dyslipidemia (increased total and LDL cholesterol), impaired glucose tolerance, and hypercalcemia (with thiazides).
- Postural hypotension.
- Impotence in up to 22% of patients.

**Practical Considerations**

- Moderate salt restriction is the key for effective antihypertensive effect of diuretics and for protection from diuretic - induced hypokalaemia.
- Thiazides are not effective in patients with renal failure (serum creatinine > 2mg /dl) because of reduced glomerular filtration rate.
- Frusemide needs frequent doses ( 2-3 /day ).Thiazides can be given once daily or every other day.
- Potassium supplements should not be routinely combined with thiazide or loop diuretics. They are indicated with hypokalemia (serum potassium < 3.5 mEq/L) especially with concomitant digitalis therapy or left ventricular hypertrophy.
- Nonsteroidal antiinflammatory drugs can antagonize diuretics effectiveness.

**Special Indications**

- Diuretics should be the primary choice in all hypertensives.



- They are indicated in:

Volume dependent forms of hypertension: blacks, elderly, diabetic, renal and obese hypertensives. Hypertension complicated with heart failure. Resistant hypertension: loop diuretics in large doses are recommended. Renal impairment: loop diuretics.

Preparations and Dosage: see table 12.

## **2. Beta - Adrenergic Blocking Agents**

### **Mechanisms of Action**

- Initial decrease in cardiac output, followed by reduction in peripheral vascular resistance.
- Other actions include decrease plasma renin activity, resetting of baroreceptors, release of vasodilator prostaglandins, and blockade of pre-junctional beta-receptors.

### **Advantages**

- Documented reduction in cardiovascular morbidity and mortality.
- Cardioprotection: primary and secondary prevention against coronary artery events (i.e. ischemia, infarction, arrhythmias, death).
- Relatively not expensive.

**Practical Considerations**

- Beta blockers are used with caution in patients with bronchospasm.
- Contraindicated in more than grade I AV, heart block.
- Do not discontinue abruptly.

**Side Effects**

- Bronchospasm and obstructive airway disease.
- Bradycardia
- Metabolic effects (raise triglycerides levels and decrease HDL cholesterol; may worsen insulin sensitivity and cause glucose intolerance). Increased incidence of diabetes mellitus.
- Coldness of extremities.
- Fatigue
- Mask symptoms of hypoglycemia.
- Impotence.

**Special Indications**

- First line treatment for hypertension as an alternative to diuretics.
- Hypertension associated with coronary artery disease.
- Hyperkinetic circulation and high cardiac output hypertension (e.g., young hypertensives).
- Hypertension associated with supraventricular tachycardia, migraine, essential tremors, or hypertrophic cardiomyopathy.

### **3. Calcium channel blockers**

#### **Types**

- Dihydropyridine: nifedipine, amlodipine, felodipine, nicardipine, lacidipine.
- Non dihydropyridine :
  - Phenylalkylamine: verapamil.
  - Benzothiazepine: diltiazem.

#### **Mechanisms of action**

- Decrease in the concentration of free intracellular calcium ions results in decreased contraction and vasodilation.
- Diuretic effect through increase in renal blood flow and glomerular filtration rate
- Inhibition of aldosterone secretion.

#### **Advantages**

- No metabolic disturbances: no change in blood glucose, potassium, uric acid and lipids. • May improve renal function.
- Maintain optimal physical, mental, and sexual activities.

#### **Special Indications**

- Ischemic heart disease: when beta blockers are ineffective or contraindicated and in vasospastic angina.
- Elderly hypertensives: second agent of choice after diuretics.
- Peripheral vascular disease (e.g., Raynaud's phenomenon).

**Side Effects**

- Dihydropyridine: flushing, headache, and lower limb oedema.
- Non dihydropyridine: aggravation of heart failure and heart block.  
Verapamil may cause constipation.

**Practical Considerations**

- Short acting dihydropyridine should be combined with beta blockers in coronary artery disease, and should be avoided in stroke, and hypertensive crisis.
- Preparations and Dosages: see table 12.
- 4. Angiotensin Converting Enzyme Inhibitors

**Types**

- Class I: captopril
- Class II (prodrug) : e.g., ramipril, enalapril, perindopril
- Class III ( water soluble) : lisinopril.

**Mechanism of Action**

- Inhibition of circulating and tissue angiotensin- converting enzyme.
- Increased formation of bradykinin and vasodilatory prostaglandins.
- Decreased secretion of aldosterone; help sodium excretion.

**Advantages**

- Reduction of cardiovascular morbidity and mortality in patients with atherosclerotic vascular disease, diabetes, and heart failure.
- Favorable metabolic profile
- Improvement in glucose tolerance and insulin resistance.
- Renal Glomerular protection effect especially in diabetes mellitus
- Do not adversely affect quality of life.

**Special Indications**

- Diabetes mellitus, particularly with nephropathy.
- Congestive heart failure.
- Following myocardial infraction.

**Side Effects**

- Cough (10 - 30%): a dry irritant cough with tickling sensation in the throat
- Skin rash (6%).
- Postural hypotension in salt depleted or blood volume depleted patients.
- Angioedema (0.2%) : life threatening.
- Renal failure: rare, high risk with bilateral renal artery stenosis
- Hyperkalaemia
- Teratogenicity.

**Practical Considerations**

- Contraindications include bilateral renal artery stenosis, pregnancy, known allergy, and hyperkalaemia.
- High serum creatinine ( $> 3$  mg/dl) is an indication for careful monitoring of renal function, and potassium. Benefits can still be obtained in spite of renal insufficiency
- A slight stable increase in serum creatinine after the introduction of ACE inhibitors does not limit use.
- ACE-I are more effective when combined with diuretics and moderate salt restriction.

Preparations and dosages: see table 12.

**5. Angiotensin Receptor Blockers****Mechanism of action**

They act by blocking type I angiotensin II receptors generally, producing more blockade of the renin - angiotensin - aldosterone axis.

**Advantages**

- Similar metabolic profile to that of ACE-I.
- Renal protection.
- They do not produce cough.

**Practical Indications**

- Patients with a compelling indication for ACE-I and who cannot tolerate them because of cough or allergic reactions.
- Preparations and Dosages: see table 12.

**6. Sympatholytics And Alpha Adrenergic Blockers****Types**

1. Alpha 1-receptor blockers: prazosin, doxazosin.
2. Centrally acting alpha 2- agonists: methyldopa, clonidine.
3. Peripherally acting adrenergic antagonists: reserpine.
4. Imidazoline receptor agonists: rilmenidine, moxonidine.

**Advantages**

- Alpha1- receptor blockers and imidazoline receptor agonists improve lipid profile and insulin sensitivity.
- Methyldopa: increases renal blood flow. Drug of choice during pregnancy.
- Reserpine: neutral metabolic effects and cheap.

**Special indications:**

- Diabetes mellitus: alpha1- receptor blockers, imidazoline receptor agonists.
- Dyslipidemia: alpha 1- receptor blockers, imidazoline receptor agonists.
- Prostatic hypertrophy: alpha 1- receptor blockers.
- When there is a need for rapid reduction in blood pressure: clonidine.

**Side Effects**

- Prazocin: postural hypotension, diarrhea, occasional tachycardia, and tolerance (due to fluid retention).
- Methyldopa: sedation, hepatotoxicity, hemolytic anemia, and tolerance.
- Reserpine: depression, lethargy, weight loss, peptic ulcer, diarrhea, and impotence.
- Clonidine: dry mouth, sedation, bradycardia, impotence, and rebound hypertension if stopped suddenly.

**Practical Considerations**

- Prazocin, methyldopa, and reserpine should be combined with a diuretic because of fluid retention.
- In Egypt, reserpine is only available as combination pill with thiazide (Brenardine) which contains 0.1 mg of reserpine per tablet.
- Preparations and Dosages: see table 12.

**7. Direct Arterial Vasodilators**

Types: hydralazine, diazoxide, nitroprusside, and minoxidil (see chapter 10).

Patients' compliance to antihypertensive medications

Poor adherence to antihypertensive therapy remains a major therapeutic challenge contributing to the lack of adequate control of blood pressure in more than two thirds of patients with hypertension. One half of all patients discontinue antihypertensive medications within one year.



**Causes of Poor Compliance**

- Hypertension has no symptoms and treatment has to continue indefinitely.
- Poor communication with the patient. Very long intervals between follow-up visits, and frequent change of doctors impair the doctor-patient relationship.
- Logistic barriers e.g. expense of medications, inability to read instructions, complicated multi- dose regimens, etc....

**Adverse drug effects.**

- Strategies to Improve Compliance
- Educate patients about the disease and involve their families in the treatment.
- Stress that treatment is life-long.
- Consider cost while prescribing.
- Consider adverse effects at initial prescription and follow up visits.
- Prescribe simple once-daily regimens.
- Allow extra visits for blood pressure measurement at no extra charge to the patient
- Arrange follow-up visits at intervals no more than three months apart, during the first year.
- Encourage life style modifications.

Table 12. Commonly Used Oral Antihypertensive Medications Class Generic Name  
Daily Dose (mg)

Categories of drugs	Common side effects	Precautions
<b>1. ACE inhibitors</b>	The most common side effect is a persistent dry cough. Others include dizziness, taste disturbance, and rashes	Not suitable during pregnancy The concomitant use of potassium supplements and potassium-containing salt substitutes is not recommended
<b>2. Angiotensin II receptor blockers</b>	Dizziness, headache	Not suitable during pregnancy The concomitant use of potassium supplements and potassium-containing salt substitutes is not recommended
<b>3. Calcium channel blockers</b>	Flushed face, headaches, swollen ankles, constipation, dizziness and tiredness	Avoid drinking large quantities of grapefruit juice Have high fibre diet and drink plenty of fluid to reduce the side effect of constipation
<b>4. Diuretics</b>	Urinary frequency, dizziness, gastrointestinal disturbance	Take the tablet in the morning Hypokalaemia can occur with some diuretics
<b>5. Beta-blockers</b>	Tiredness, cold hands and feet, slow heartbeat, diarrhea and nausea, sleep disturbances, nightmares	May trigger asthmatic attack in patients with asthma or chronic bronchitis Symptoms of hypoglycaemia may be masked in diabetic patients

<b>6. Alpha-blockers</b>	Drowsiness, hypotension (notably postural hypotension), syncope, asthenia, dizziness, headache and dry mouth	Take first dose at bedtime to avoid postural hypotension
<b>7. Centrally acting antihypertensive drugs</b>	Headache, dizziness, dry mouth	May cause drowsiness, if affected, patients should not drive or operate machinery Do not drink alcohol because this may worsen the side effects
<b>8. Vasodilator</b>	Headache, nausea, vomiting, tachycardia	Should tell your doctor if you develop symptoms of arthritis, unexplained fever or tiredness

## COMPLICATIONS

The excessive pressure on your artery walls caused by high blood pressure can damage your blood vessels, as well as organs in your body. The higher your blood pressure and the longer it goes uncontrolled, the greater the damage.

Uncontrolled high blood pressure can lead to complications including:

- **Heart attack or stroke.** High blood pressure can cause hardening and thickening of the arteries (atherosclerosis), which can lead to a heart attack, stroke or other complications.

- **Aneurysm.** Increased blood pressure can cause your blood vessels to weaken and bulge, forming an aneurysm. If an aneurysm ruptures, it can be life-threatening.
- **Heart failure.** To pump blood against the higher pressure in your vessels, the heart has to work harder. This causes the walls of the heart's pumping chamber to thicken (left ventricular hypertrophy). Eventually, the thickened muscle may have a hard time pumping enough blood to meet your body's needs, which can lead to heart failure.
- **Weakened and narrowed blood vessels in your kidneys.** This can prevent these organs from functioning normally.
- **Thickened, narrowed or torn blood vessels in the eyes.** This can result in vision loss.
- **Metabolic syndrome.** This syndrome is a cluster of disorders of your body's metabolism, including increased waist circumference; high triglycerides; low high-density lipoprotein (HDL) cholesterol, the "good" cholesterol; high blood pressure and high insulin levels. These conditions make you more likely to develop diabetes, heart disease and stroke.
- **Trouble with memory or understanding.** Uncontrolled high blood pressure may also affect your ability to think, remember and learn. Trouble with memory or understanding concepts is more common in people with high blood pressure.

**Dementia:** Narrowed or blocked arteries can limit blood flow to the brain, leading to a certain type of dementia (vascular dementia). A stroke that interrupts blood flow to the brain also can cause vascular dementia.

### **PRESCRIBING PATTERN OF ANTIHYPERTENSIVES**

High BP can be treated using several classes of drugs. ACE inhibitors, ARBs, beta blockers, Diuretics, calcium channel blockers, alpha blockers, peripheral vasodilators are the primary drugs used in hypertension treatment and by changing life style factors including losing weight, quitting smoking, taking healthy diet, increasing water intake, exercising regularly, limiting alcohol consumption . In addition to this compiling indication require appropriate selection of drugs.<sup>[10]</sup> Study of prescribing pattern is a component of medical audit to evaluate and monitoring the prescribing practices of prescribers for achieving the rational medical care for the hypertensive patients.<sup>[11]</sup>

### **Hypertension in diabetes**

According to JNC VII patients with diabetes, the aim should be to maintain systolic pressure <130mmHg and diastolic pressure <80mmHg. But in some individuals, it may not be possible to achieve this level of control without appropriate therapy. Most patients require a combination of antihypertensive drugs. Hypertension is common in type 2 diabetes, and antihypertensive treatment prevents macro vascular and micro vascular complications. In type 1 diabetes, hypertension usually indicates the presence of diabetic nephropathy. An ACE inhibitor (or an angiotensin-II receptor antagonist) may have a specific role in the management of diabetic nephropathy in patients with type 2 diabetes, an ACE inhibitor (or an

angiotensin-II receptor antagonist) can delay progression of micro albuminuria to nephropathy.<sup>[3]</sup>

### **Hypertension in CKD patients**

Patients with hypertension develop damage to the renal parenchyma and renal arteries. CKD initially present with micro albuminuria and leads to macro albuminuria. AEI and ARBs reduce intraglomerular pressure which provide additional benefit for further reducing the renal function. So this is the drug of choice for controlling the BP in CKD patients. ACE inhibitors and ARBs combination is more effective than agent used alone, but routine use is controversial. diuretics and third antihypertensive drug class ( $\beta$ -blockers and CCB) is effective in these patients. ACE inhibitors is contraindicated in renal artery stenosis.<sup>[2]</sup>

### **Hypertension in CVA patients**

Attaining a BP goal who experience stroke is considered a primary modality to reduce the risk of secondary stroke. One clinical trial and Progress demonstrated that ACE inhibitor in combination with thiazide diuretics decrease the incidence of recurrent stroke in patient with history of stroke or TIA<sup>[4]</sup>

### **Essential hypertension**

Over 90% of individual with hypertension have essential hypertension. Genetic factor play an important role in the development of essential hypertension.<sup>[2]</sup>

**Hypertension in ischemic heart disease**

Hypertensive patient are at increased risk for MI or other major coronary event and may be at higher risk of death at following acute MI. Unless contraindication pharmacotherapy should be initiated with  $\beta$ -blockers reduce the blood pressure, reduce symptoms of angina, improve mortality and reduces cardiac output, heart rate and AV conduction. Treatment also includes smoking cessation, management of diabetes, lipid lowering, exercise training and weight reduction in obese patients. If  $\beta$ -blockers is contraindicated in presence of severe airway reactive disease, high degree of AV block or sick sinus syndrome, either long acting Dihydropyridine or Nondihydropyridine type CCB may be used. CCB decrease the total peripheral resistance, which lead to reduction in blood pressure and in wall tension. Nondihydropyridine CCB in combination cause severe bradycardia or high degree of heart block. Therefore long acting dihydropyridine CCB are preferred for combination therapy with  $\beta$ -blockers. If the blood pressure is not controlled by these drugs nitrates can be added. But they are used caution with patients taking Phosphodiesterase 5 inhibitor such as sildenafil. <sup>[4]</sup>

**Hypertension in heart failure**

For hypertensive patients with heart failure five drug classes are listed as compiling indication for heart failure. The primary mechanism is decreased cardiac contractility. ACE inhibitors are recommended as the first drug of choice based on many numerous outcome studies showing decreased morbidity and mortality.  $\beta$  blockers is appropriate to further modify the disease in systolic heart failure. In patients with standard regimen of diuretics and ACE inhibitors  $\beta$ -blockers produce

reduction in morbidity and mortality. Early data suggest that ARBs may be better than ACE inhibitors in systolic heart failure. The addition of aldosterone antagonist can reduce morbidity and mortality of systolic heart failure. Eplerenone the newest aldosterone antagonist has been studied in patient with symptomatic systolic heart failure within 3-14 days. CCB are contraindicated in heart failure patients.

### **Hypertension in post myocardial infarction**

Hypertension is a strong risk factor for MI. Once the patient experiences hypertension it is essential to control hypertension for avoiding the secondary prevention of cardiovascular event. B blockers and ACE inhibitors are recommended for American college of cardiology/American Heart Association post MI guidelines. These two drug classes with  $\beta$  blockers first, considered the first drug of choice for the patients who have MI. Eplerenone has been shown recently reduce morbidity and mortality.<sup>[4,11]</sup>

### **Hypertension in Left ventricular hypertrophy**

LVH is an independent risk factor for CAD and is considered a cause of organ damage. LVH occurs in 50% of hypertensive patients. All classes of antihypertensive agent except vasodilators prevent LVH. ACE Inhibitors and ARBs are considered most effective agent for regressing LVH.

### **Hypertension in peripheral artery disease**

Major risk factor for peripheral artery disease is hypertension, diabetes and smoking. Antihypertensive drug therapy is ineffective in relieving the symptoms of



PAD. Vasodilator agent such as ACE inhibitors CCB , $\alpha$  -blockers and direct vasodilators do not improve walking distance or symptoms of claudication.<sup>[4]</sup>

### **Resistant Hypertension**

Resistant hypertension is defined as the failure to achieve goal BP in patient who are adhering to full dose of an appropriate three drug regimen that include diuretics. If resistant hypertension is persists after remediable causes are identified and corrected, then a concerted search for a cause of secondary hypertension should be conducted.

#### **Causes of resistant hypertension**

- ❖ Improper BP measurement
- ❖ Volume overload
  - Excess sodium intake
  - Volume retention from kidney disease
  - Inadequate diuretic therapy
- ❖ Drug induced
  - Non adherence
  - Inadequate dose
  - Inappropriate combination
  - NSAIDs
  - Oral contraceptives & Adrenal steroid hormone
  - Cocaine & Amphetamine

- Cyclosporine and Tacrolimus
- Erythropoietin
- Licorice & OTC drugs (e.g. Ephedra, ma huang, Bitter orange)

Associate condition

- ❖ Obesity
- ❖ Excess alcohol intake

### **Hypertension and Hyperuricemia**

Hypertension affects approximately one-third of Americans and is a leading cause of morbidity and mortality. While the etiology of hypertension is unclear in many patients, uric acid has been hypothesized to activate the renin-angiotensin system, which can lead to injury to pre-renal blood vessels. Recently, a novel rodent model of arteriopathy and hypertension induced by mild hyperuricemia has brought renewed interest into this hypothesis. Furthermore, a cross-over randomized trial of 30 hyperuricemic adolescents with hypertension demonstrated that lowering uric acid levels with allopurinol led to lowering blood pressure over a 4-week period.<sup>[14]</sup>

### **Antihypertensive fixed dose combination**

In recent years the fixed dose combination has not been favoured with many physicians particularly in the United Kingdom. Offends labelled it as 'polypharmacy'. Fixed dose combinations are still viewed suspiciously in some quarters for the treatment of hypertension. There is a renewed interest in the use of

low-dose combination therapy and increasing recognition that this approach may offer efficacy and tolerability with simplicity.

Advantages are

- Hypertension is heterogeneous in its response to treatment and a combination of two drugs will increase the response in a given individual.
- There may be enhancement of each drugs antihypertensive effect which in ideal combinations may even be synergistic rather than simply additive.
- As the two drugs exert their antihypertensive effects by differing modes of action there is a potential for a smoother onset and longer duration of action.
- By keeping both drugs at low dose the incidence of side effects from each may be minimized.
- In many cases the combination of the two drugs can offset each other's side-effect profile to some degree, e.g.: the hypokalemia caused by thiazide diuretics can be prevented by concurrent use of an ACE inhibitor, and palpitations caused by some CCB's may be reduced by  $\beta$ -blocker therapy.
- Different mechanisms may exert different beneficial effects beyond the benefits of blood pressure reduction on target organs. When a hypertensive patient develops cardiac, renal, or cerebral end-organ damage their prognosis worsens.<sup>8</sup> Combination treatments may reduce the rate of progression. For example trials have shown that an ACE inhibitor plus a nondihydropyridine CCB have a greater effect on reducing hypertension-induced left ventricular hypertrophy than monotherapy. The ACE inhibitor

lisinopril and the CCB verapamil also significantly reduce microalbuminuria, an indication of renal damage.

- Combination therapies, particularly in low dose, can usually be taken once daily with improvement in patient compliance with treatment.
- Dose adjustments and titration will be simpler, blood pressure targets will be attained more quickly, and require fewer clinic or physician visits will be required to achieve targets.
- The overall cost of treatment can be reduced. Low dose combination products may be less costly than the constituents prescribed separately and prescribing costs may be less in some countries for a single medication rather than for two separate drugs.<sup>[15]</sup>

## **KNOWLEDGE ATTITUDE AND PRACTICE OF HYPERTENSION**

Hypertension is a frequent condition and is control through both non-pharmacological lifestyle factors and pharmacological treatment. Pharmacological treatment for hypertension has been shown to be effective in decreasing BP and subsequently cardiovascular event, although BP levels achieved in treated patients may still be considerably higher than those in truly normotensive persons. Lifestyle measures for lowering BP include reduced alcohol intake, reduced sodium chloride intake, increased physical activity, and control of overweight. Lifestyle interventions also have the potential to reduce the need for or the amount of medications in hypertensive and prevent high BP from developing in non-hypertensive. The lifestyle interventions are also controlling other concomitant cardiovascular risk

factors not necessarily related to hypertension, such as smoking, raised cholesterol level, or diabetes, hence the importance of a multi factorial approach to effective risk reduction in hypertensive. Several models have been proposed to account for health behaviours and sustained behavioural changes. Although they may differ in content and perspective, models for behaviour change stress the importance of evaluating the perceptions, attitudes, beliefs, and outcome expectations of individuals as a crucial means to understand observed behaviours and to guide behavioural change. A proper assessment and understanding of KAP factors is particularly helpful in the area of chronic conditions such as hypertension, for which prevention and control necessitate a lifelong adoption of healthy lifestyles.<sup>[16]</sup>

**STRESS :-**

Each person responds to stress in a different way, but too much stress can lead to health problems.

Stress is the body's natural defense against predators and danger. It flushes the body with hormones to prepare systems to evade or confront danger. This is known as the "fight-or-flight" mechanism.

When we are faced with a challenge, part of our response is physical. The body activates resources to protect us by preparing us either to stay and fight or to get away as fast as possible.

The body produces larger quantities of the chemicals cortisol, adrenaline, and noradrenaline. These trigger an increased heart rate, heightened muscle preparedness, sweating, and alertness. All these factors improve the ability to respond to a hazardous or challenging situation.

Factors of the environment that trigger this reaction are called stressors. Examples include noises, aggressive behavior, a speeding car, scary moments in movies, or even going out on a first date. The more stressors we experience, the more stressed we tend to feel.

### **Changes to the body**

Stress slows normal bodily functions, such as the digestive and immune systems. All resources can then be concentrated on rapid breathing, blood flow, alertness, and muscle use.

The body changes in the following ways during stress:

- Blood Pressure and pulse rate rise
- Breathing is faster
- The digestive system slows down
- Immune activity decreases
- The muscles become tense
- A heightened state of alertness prevents sleep

How we react to a difficult situation will affect how stress affects us and our health. A person who feels they do not have enough resources to cope will be more likely to have a stronger reaction, and one that can trigger health problems. Stressors affect individuals in different ways.

Some experiences that are generally considered positive can lead to stress, such as having a baby, going on a trip, moving to a nicer house, and being promoted.

This is because they often involve a major change, extra effort, new responsibilities, and a need for adaptation. They are also steps into the unknown. The person wonders if they will cope.

A persistently negative response to challenges can have a detrimental effect on health and happiness. However, being aware of how you react to stressors can help reduce the negative feelings and effects of stress, and to manage it more effectively.

## **Types**

The APA recognizes three different types of stress that require different levels of management.

### **Acute stress**

This type of stress is short-term and is the most common way that stress occurs. Acute stress is often caused by thinking about the pressures of events that have recently occurred, or upcoming demands in the near future.

For example, if you have recently been involved in an argument that has caused upset or have an upcoming deadline, you may feel stress about these triggers. However, the stress will be reduced or removed once these are resolved.

It does not cause the same amount of damage as long-term, chronic stress. Short-term effects include tension headaches and an upset stomach, as well as a moderate amount of distress.

However, repeated instances of acute stress over a long period can become chronic and harmful.

### **Episodic acute stress**

People who frequently experience acute stress, or whose lives present frequent triggers of stress, have episodic acute stress.

A person with too many commitments and poor organization can find themselves displaying episodic stress symptoms. These include a tendency to be irritable and tense, and this irritability can affect relationships. Individuals that worry too much on a constant basis can also find themselves facing this type of stress.

This type of stress can also lead to high blood pressure and heart disease.

### **Chronic stress**

This is the most harmful type of stress and grinds away over a long period.

Ongoing poverty, a dysfunctional family, or an unhappy marriage can cause chronic stress. It occurs when a person never sees an escape from the cause of stress and stops seeking solutions. Sometimes, it can be caused by a traumatic experience early in life.



Chronic stress can continue unnoticed, as people can become used to it, unlike acute stress that is new and often has an immediate solution. It can become part of an individual's personality, making them constantly prone to the effects of stress regardless of the scenarios they come up against.

People with chronic stress are likely to have a final breakdown that can lead to suicide, violent actions, heart attacks, and strokes.

### **Causes**

We all react differently to stressful situations. What is stressful to one person may not be stressful to another. Almost anything can cause stress. For some people, just thinking about something or several small things can cause stress.

Common major life events that can trigger stress include:

- Job issues or retirement
- Lack of time or money
- Bereavement
- Family problems
- Illness
- Moving home
- Relationships, marriage, and divorce

Other commonly reported causes of stress are:

Different situations can trigger stress for different people.

- Abortion or miscarriage
- Driving in heavy traffic or fear of an accident
- Fear of crime or problems with neighbors
- Pregnancy and becoming a parent
- Excessive noise, overcrowding, and pollution
- Uncertainty or waiting for an important outcome

Some situations will affect some people and not others. Past experience can impact how a person will react.

Sometimes, there is no identifiable cause. Mental health issues, such as depression, or an accumulated sense of frustration and anxiety, can make some people feel stressed more easily than others.

Some people experience ongoing stress after a traumatic event, such as an accident or some kind of abuse. This is known as post-traumatic stress disorder (PTSD). Those who work in stressful jobs, such as the military or the emergency services, will have a debriefing session following a major incident, and they will be monitored for PTSD.

## Symptoms

The physical effects of stress include:

- Sweating
- Pain in the back or chest
- Cramps or muscle spasms
- erectile dysfunction and loss of libido
- Fainting
- Headache
- Heart disease
- High blood pressure
- Lower immunity against diseases
- Muscular aches
- Nervous twitches
- Pins and needles
- Sleeping difficulties
- Stomach upset

A 2012 study suggested that the stressors experienced by parents, such as financial troubles or managing a single-parent household, can lead to obesity in their children.

**Emotional reactions** can include:

- Anger
- Anxiety
- Burnout
- Concentration issues
- Depression
- fatigue
- A feeling of insecurity
- Forgetfulness
- Irritability
- Nail biting
- Restlessness
- Sadness

**Behaviors** linked to stress include:

- Food cravings and eating too much or too little
- Sudden angry outbursts
- Drug and alcohol abuse
- Higher tobacco consumption
- Social withdrawal
- Frequent crying
- Relationship problems

**Diagnosis**

A doctor will normally diagnose stress by asking the patient about symptoms and life events.

Diagnosis is complex. It depends on many factors. Questionnaires, biochemical measures, and physiological techniques have been used, but these may not be objective or effective.

The most direct way to diagnose stress and its effects on a person is through a comprehensive, stress-oriented, face-to-face interview.

**Treatment**

Treatment includes self-help and, in instances where the stress is caused by an underlying condition, certain medications.

Therapies that may help to induce relaxation include aromatherapy or reflexology.

Some insurance providers cover this type of treatment, but be sure to check before pursuing this treatment.

**Medicines**

Doctors will not usually prescribe medications for coping with stress, unless the patient has an underlying illness, such as depression or a type of anxiety.

In that case, the doctor is treating a mental illness and not the stress.

In such cases, an antidepressant may be prescribed. However, there is a risk that the medication will only mask the stress, rather than help you deal and cope with it. Antidepressants can also have adverse effects.

Developing some coping strategies before stress hits can help an individual manage new situations and maintain physical and mental health. If you are already experiencing overwhelming stress, seek medical help.

### **Stress management techniques**

Stress management can help to:

- Remove or change the source of stress
- Alter the way you view a stressful event
- Lower the impact that stress might have on your body
- Learn alternative ways of coping

Stress management therapy pursues one or more of these approaches.

Techniques for stress management can be gained from self-help books, online resources, or by attending a stress management course. A counselor or psychotherapist can connect an individual who has stress with personal development courses or individual and group therapy sessions.

## LITERATURE REVIEW

**Rakumakoe M. et al.** conducted a study to determine the knowledge, attitudes and perceptions of hypertensive patients towards lifestyle modification in controlling hypertension. Worldwide, hypertension is the third leading risk factor contributing to death, surpassed only by malnutrition and smoking. Patients with hypertension (n=110) were identified from a cohort of patients attending the outpatients department of Carletonville hospital, a district hospital situated in the mining town of Carletonville, South Africa, and were then invited to participate in the study. The results of this study suggest that although patients do receive advice on lifestyle modification, it is not effective in changing patient behaviour, and may therefore be inadequate and not emphasized enough and also not all patients are advised by medical professionals about lifestyle change.

**Aghaji M. et.al.** conducted a study to determine the knowledge, attitude to hypertension and lifestyle habits of rural dwellers in owerre-nkwoji, imo state nigeria hypertension accounts for 13% of global mortality, with 25% prevalence in nigeria. Current trends in management are lifestyle modification. Information on lifestyle habits is needed for effective intervention programme. Hypertension is recorded as a major type of cardiovascular disease which affects one billion people worldwide and claims the life of seven million (american heart association study was descriptive, done among rural dwellers between ages 20 and 75 in owerre-nkwoji, imo state. The study population was 120 rural dwellers (44 males and 76 females aged between 20 and 75 years)., 2006). It accounts for 13% of global mortality (katib, 2004) with 25% prevalence in Nigeri (danbauchi, 2007) awareness of participants on hypertension issues was 44% against the 50% in the study by ike

et al. (2010). Misconception was also apparent in this study as in theirs. For example, stroke and hypertension can be caused by gods or enemy, respectively.

**Kaplan n. et.al.** conducted a study to determine the level of knowledge about hypertension in cilayung village district Jatinangor, sumedang. Hypertension known as a silent killer because it is often asymptomatic and causes target organ damage. Prevention of hypertension and its complications are pharmacological and non-pharmacological therapy, making holistic knowledge of hypertension is paramount to establish good behaviour. Respondents were 116 cilayung residents equally divided in hypertensive and non-hypertensive groups. Respondent's blood pressure was measured and they completed questionnaires during october 2012. The respondents' characteristics in both groups dominated by females, aged 50-59 years, housewives, with elementary school background. Most respondents in both groups had sufficient knowledge about hypertension in general, but the risk factors, treatment, and complications were still not enough. There is no difference in level of knowledge about hypertension between both groups in cilayung.

**Shaikh M. et.al.** conducted a study to determine the *knowledge, attitude, and practice of general population of Guntur toward silent killer diseases: hypertension and diabetes*. The objective was to study the demographic details of hypertensive and diabetic patients and their knowledge, attitude, and practices (KAP) regarding their illness. They examined kap on hypertension and diabetes in a sample of 50 adult hypertensive patients and 50 adult diabetic patients aged above 20 years. KAP's were assessed during the period from October 2014 to January 2015. Altogether 50 hypertensive and 50 diabetic patients were enrolled in the study. They conclude that the motivation and counselling stressing the importance of



lifestyle modifications and self-management is required for the patients suffering with chronic diseases such as hypertension and diabetes. Patient counselling by the clinical pharmacist can play a vital role in imparting education to the diabetic and hypertensive patients.

**Grove C. et.al** conducted a study to determine the knowledge, attitude and practice about hypertension in hypertensive patients attending hospitals in Baghdad, Iraq. Patients' knowledge and attitudes have an impact on the management of their illnesses. Obtaining information about the level of awareness is the first step in formulating a preventive program for any health problem. This cross-sectional study was conducted during the period from July to August 2016 in three teaching hospitals (Baghdad medical city, al-yermouk, and al-kindy teaching hospitals). The key finding of the present study showed that majority of the hypertensive patients had good. The senior citizens, the highly educated, those who had long duration of the disease and those with a positive family history of hypertension showed better knowledge than others.

**Ibrahim M.et.al.** conducted a study to determine the knowledge, attitudes and practices of hypertensive patients towards prevention and early detection of chronic kidney disease (CKD). Hypertension is the second most common cause of chronic kidney disease (CKD). A cross-sectional study was held using the CKD screening index to assess the knowledge of 374 hypertensive patients who were selected from multiple primary healthcare centers in Nablus, Palestine. In total, 374 hypertensive patients participated in the study. The mean age of participants was  $59.14 \pm 10.4$  years, (range 26–85). The median (interquartile range) of the knowledge, attitude, and practice scores of hypertensive patients towards prevention and early detection

of ckd were 20 (16–23), 69 (65–72), and 39 (36–42), respectively. Among hypertensive patients, higher scores for total knowledge and attitudes toward prevention, male sex, and normal BMI were associated with modestly higher scores for prevention practices. A cross-sectional design was used to assess the knowledge, attitudes and practices of hypertensive patients towards prevention and early detection of ckd by using a newly developed instrument called ckd screening index.

**Kearney P.et.al** conducted a study to determine the perception and practice of lifestyle modification in the management of hypertension among hypertensive in south-east Nigeria. Hypertension ranks first among the non-communicable diseases in Nigeria and globally. Interventions like lifestyle modifications, with its advantages, are often overlooked. awareness level and practice of lifestyle modification in blood pressure control among the studied cohort is poor. Concerted strategies need to be taken to improve these. Hypertension is the largest risk factor for cardiovascular diseases, growing in prevalence and poorly controlled virtually everywhere. This was a descriptive cross-sectional study carried out in olokoro, a semi-urban community in umuahia south local government area of abia state, south-east Nigeria.

**Whelton M.et.al.** conducted a study to determine the, prevalence and awareness of hypertension and associated risk factors among bank workers in Owerri ,Nigeria, hypertension is largely asymptomatic and common among adult Nigerians, and considered to be of public health importance. Banking work is associated with stress, a risk for hypertension. To evaluate the prevalence and awareness of hypertension and its associated risk factors among bankers in owerri. This cross-sectional descriptive study was aimed at determining the knowledge,

prevalence of hypertension and other risk-factors for cardiovascular disease among bank workers in owerri. This is made up of all the professional bank workers in the selected banks' main branch and a branch of each of them. Hypertension is prevalent among Nigerians and associated with high level of morbidity and mortality and bank workers are not exempted from it. Their job specification can be stressful and can be associated with elevated blood pressure.

**Dodu. R. et.al** conducted a study to determine the, knowledge, awareness, and medication adherence in patients with hypertension from a tertiary care centre from northern Sri Lanka. Hypertension is a major public health burden and is part of an epidemiological transition from communicable to non communicable diseases globally hypertension remains a challenging medical condition among the non communicable diseases of ever growing population. Efforts to control ht include increasing public knowledge and awareness about the risks associated with high bp. We conducted this cross-sectional descriptive survey to evaluate the current status of hypertension knowledge, awareness, and adherence in a group of hypertensive patients from a distinct community.

**Bilal M.et.al** conducted a study to determine the, knowledge, attitude and practice on hypertension among antihypertensive medication users hypertension is growing among the population of Nepal. Across-sectional study was conducted among the hypertensive patients in Bharatpur, Chitwan, Nepal from July 2015 to September 2015 using clustered sampling technique. Suitably designed and validated questionnaire of knowledge, attitude and practice on hypertension consisting of 27 questions were used to determine the kap scores. The difference in the median kap scores between sex, level of education and duration of hypertension

were assessed using mann-whitney u test .a total of 200 patients met the inclusion criteria and majority of them were male (60% ranged from 100-180/60-110 mmhg. The median k, a and p scores were 8 (6), 5 (1) the current knowledge, attitude and practice among hypertensive patients using antihypertensive medication can be improved.

**Anzhela T.et.al** conducted a study to assess the knowledge, attitude and practice of life style modification measures among hypertensive patients in north – western nigeria. Hypertension is a major health problem throughout the world with high morbidity and mortality rate. Despite all that is known about its adverse health consequences, high blood pressure (BP) is still poorly controlled in Nigeria. The study was cross sectional carried out in murtala muhammad specialist hospital, kano a tertiary healthcare institution in kano state, the north-western region of Nigeria. The study protocol was approved by the research and ethics committee of the hospital, before the commencement of the study. This study revealed that there is a good level of awareness of lifestyle modification which is needed in the management of hypertension. However, the level of knowledge and practice is relatively low. Measures need to be taken to improve both knowledge and practice of this non-pharmacological aspect of patients care.

**Williams M.et.al** conducted a study to determine the knowledge and lifestyle practices of hypertensive patients attending a primary health care clinic in Botswana. Hypertension is a significant public health problem in many developing countries experiencing epidemiological transition from communicable to non-communicable chronic diseases. A quantitative cross-sectional descriptive survey was conducted among patients with hypertension attending extension ii clinic for

follow-up care in Gaborone. A self-administered questionnaire translated from English to Setswana (local language) consisting of both closed and open-ended questions was used to collect data. Participants' level of knowledge varied from average to high as almost all of them 96% and 97% gave a correct response for practices related to prohibiting/preventing smoking and reducing the levels of stress respectively.

**Chockalingam A.et.al** conducted a study to determine the knowledge, attitude and practice of Iranian hypertensive patients regarding hypertension. Hypertension is a major risk factor for chronic diseases and deaths worldwide with age-standardized prevalence of 24.1% and 20.1% in men and women respectively. In the present across-sectional study, 110 hypertensive patients who referred to Shahid madani hospital were participated. Males and females subjects who had diastolic blood pressure >140 and systolic blood pressure >90 on two consecutive reading and aged >30 were participated in the present study. The prevalence of hypertension in Iran is increasing and for decreasing the burden of disease, focusing on kap of patient by implementing the educational intervention is essential. Accordingly, the results of the present study showed that the knowledge and practice of hypertensive patients is medium.

**Koram k. A.et.al** conducted a study to determine the prevention and management of hypertension, knowledge and attitudes of women of childbearing age. Prevention of high blood pressure is recognized as the controlling key to hypertension especially in developing countries. Identification of the level of knowledge and attitude of the population is however, an optimum steps to prevention. The act of health promotion and disease prevention is economical.

However, benefits are sometimes seen many years later. This makes it less tangible for politicians to invest especially in communities of ever increasing emergence of communicable diseases. Hypertension is a term used to describe high blood pressure. Flow of blood is based on the beat of which the heart pumps blood .perspectives and behaviour of persons have great influence on determining the quality of health care services. Research is required to clarify the relationship between lifestyles, individual behaviours, health and illnesses. Developing country is a self explanatory term that is used to describe most countries with low level of standard living.

**Bhansali. A et al** conducted a study on the on the topic Prevalence of and risk factors for hypertension in urban and rural India: the ICMR–INDIAB study to determine the prevalence of hypertension (HTN) and its risk factors in urban and rural India. Multivariate regression analysis showed that age, male gender, urban residence, generalized obesity, diabetes, physical inactivity and alcohol consumption were significantly associated with HTN. Salt intake 6.5□g per day, shows significantly higher risk for HTN even after adjusting for confounding variable.

**Pitzalis et al** conducted a study on the influence of gender and family history of hypertension on autonomic control of heart rate, diastolic dysfunction and brain natriuretic peptide. When gender is considered, sensitivity value significantly differs in males but not females. In male, the hypertensive offspring have modified diastolic function and heart rate. BNP is the only parameter able to characterize hypertensive offspring independently from the influence of gender. This provides the hypothesis that the impaired production of this hormone could play a primary role in the pre-hypertensive state.

## **AIM & OBJECTIVES**

### **AIM:**

- To evaluate the Knowledge, Attitude and Practice among Hypertensive patients.

### **OBJECTIVES:**

- To assess the patient knowledge, attitude, and practice in hypertension.
- Prevalence of hypertension (Age, Gender).
- Blood pressure categorization according to JNC VII guide line.
- Risk factor and Stress assessment on Hypertension.
- Assess the Co Morbidities with Hypertension.

## METHODOLOGY

### STUDY DESIGN

It was a prospective observational study conducted in the super speciality hospital Chennai for a period of November 2017 to September 2018.

### SAMPLE SIZE

The sample size was calculated using the formula

$$N = \frac{Z_{\alpha}^2 p q}{D^2}$$

Where  $\alpha$  - type 1 error or false positive error.

$$Z_{\alpha} = 1.96 = 2$$

P - Anticipated percentage of antihypertensive drug used among the patient admitted in cardiology hypertensive outpatient and hypertensive in patients.

$$q = 100 - p$$

d- Precision factor which is 20% of p

### ENROLLMENT

- INCLUSION CRITERIA

All patients above age 18 years who were willing to participate in the study of both sex groups having hypertension were included in the study.



- **EXCLUSION CRITERIA**

Psychiatry patients, pregnant women and patient admitted for surgery and the patient who were not willing to participate in the study were excluded.

**DATA COLLECTION**

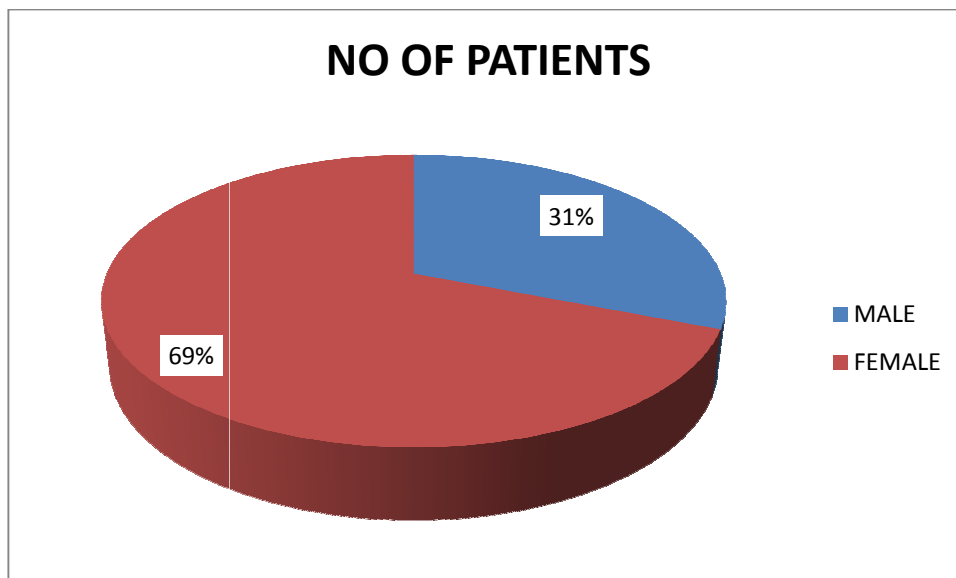
The patient data was collected from the case file. Before collecting the details a written informed consent was taken from all patients. Identity of patient was kept confidential. Data was collected and documented with by using data collection form. Data like name, age, sex, general examination, vital signs, laboratory investigation, concurrent disease, risk factors, past medications and ongoing treatment including individual drugs.

Analyse the major risk factors for hypertension by direct interview and from their case chart. Cohen perceived stress scale was used to assess the severity of stress. It contain 10 questions. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale.<sup>[17]</sup> BMI Categorization done by taking their weight and height and categorize it as underweight, normal, overweight and obese.

Knowledge, Attitude and Practice of the patient was collected using validated KAP Questionnaire. Assessment has done either by giving questionnaire to the patient or read out if them illiterate. And a leaflet had given to every patient before counselling. Each question carries one point. The patient that gives accurate reply got one point and remaining got zero. Thereby total points were calculated before and after counselling.

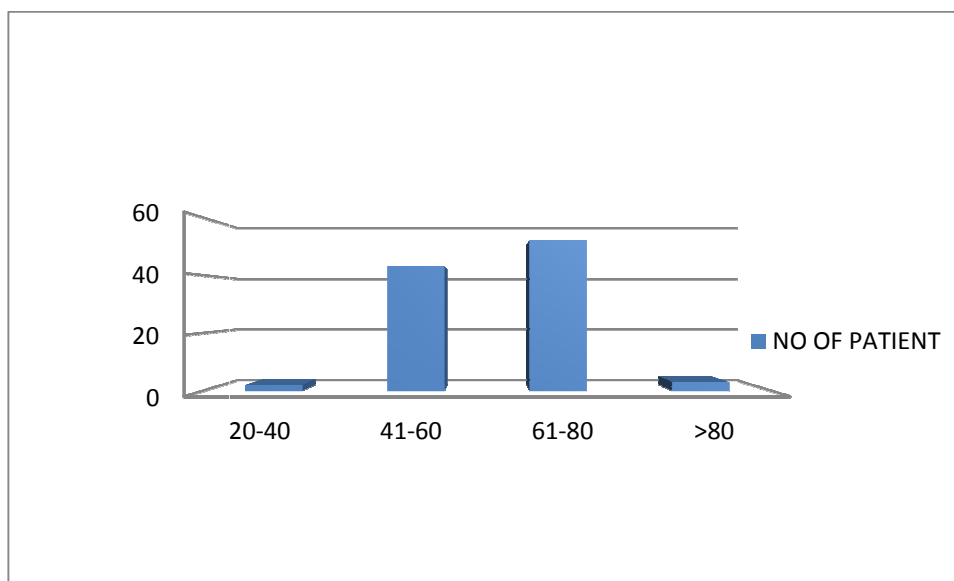
## RESULTS

### GENDER CATEGORISATION

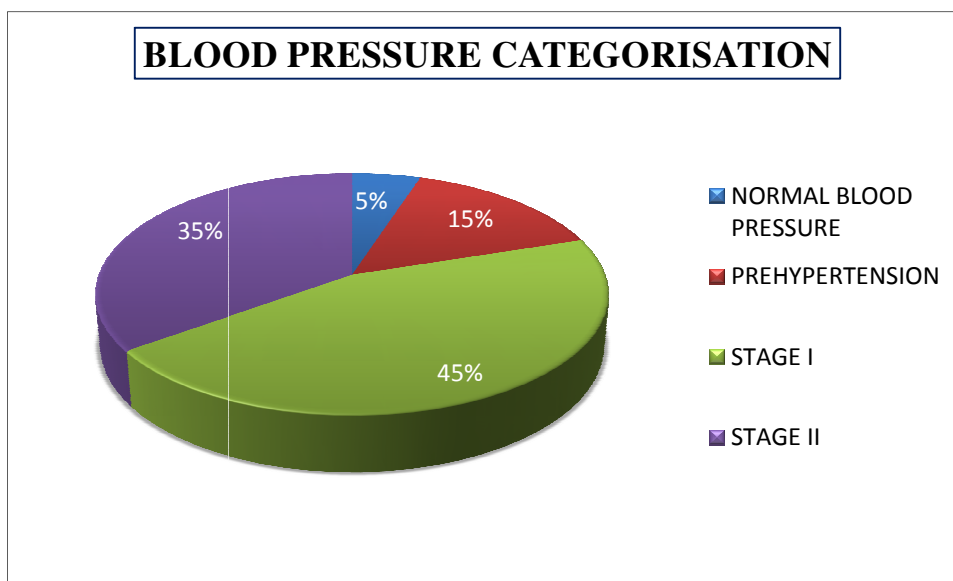


**Figure. No: 1 Frequency and percentage of blood pressure categorization according to JNC VII guide line.**

The chart 1 shows the percentage of each sex involved in our study in which majority of people were female, 69% which is more than twice the percentage of male, 31%.

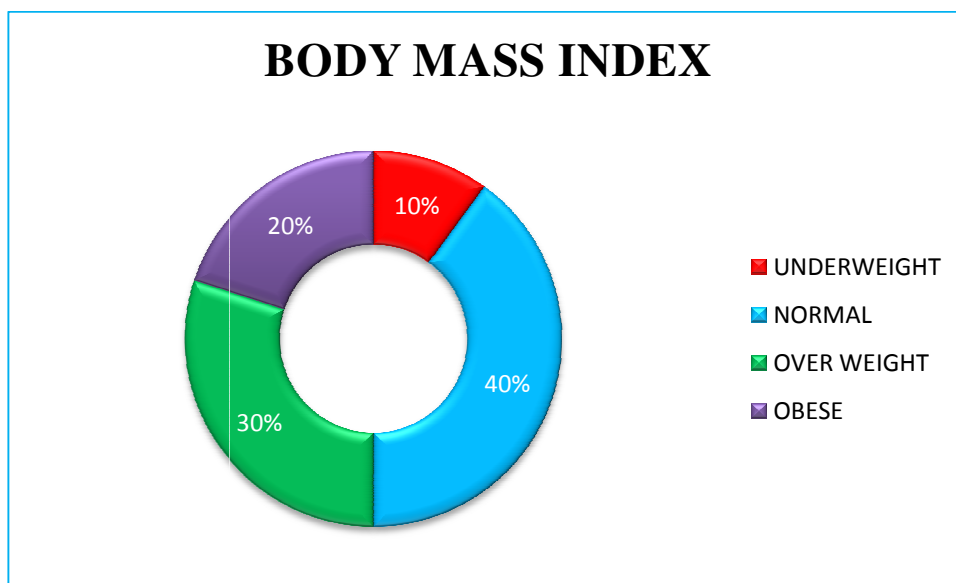
**AGE DISTRIBUTION****Figure No: 2 Age distribution of anti hypertensive patients**

The figure 2 Shows reveals the age distribution of patients involved in the study. The participant of the study were divided into four subgroups based of the age such as 20-40, 41-60, 61-80 and more than 80yrs. Most of the patients were in the age group of 61-80yrs and that had a count of 52% followed by 43% of 41-60yrs and the least were in the age group of 20-40yrs, 2%.

**BLOOD PRESSURE CATEGORIZATION**

**Figure No: 3 Frequency and percentage of blood pressure categorization according to JNC VII guide line**

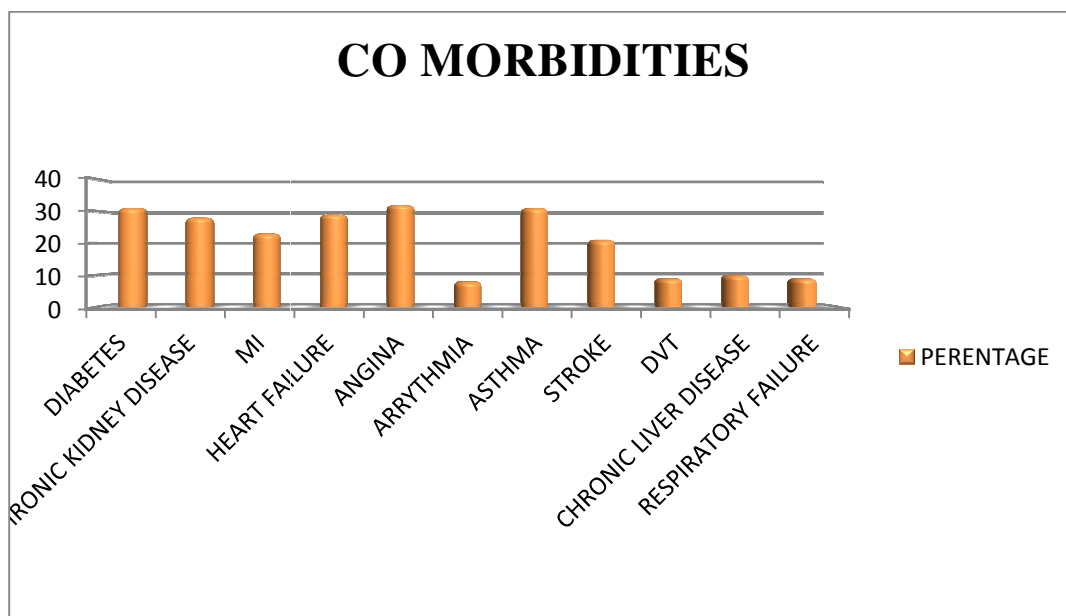
Figure 3 shows reveals that among 100 patients in the study, 45% of the patients have stage 1 hypertension, more than one fourth i.e. 35% have stage 2, less than one fourth i.e. 15% have prehypertension and the remaining 5% have normal blood pressure.

**BODY MASS INDEX**

**Figure No 4: Frequency and distribution of BMI grade in hypertensive patients**

Figure 4 shows that among 100 hypertensive patients enrolled in the study, nearly half of the patients, 40% have normal body weight, followed over weight patients of 30%, nearly one fifth are obese i.e. 20% and the underweight accounts only 10%.

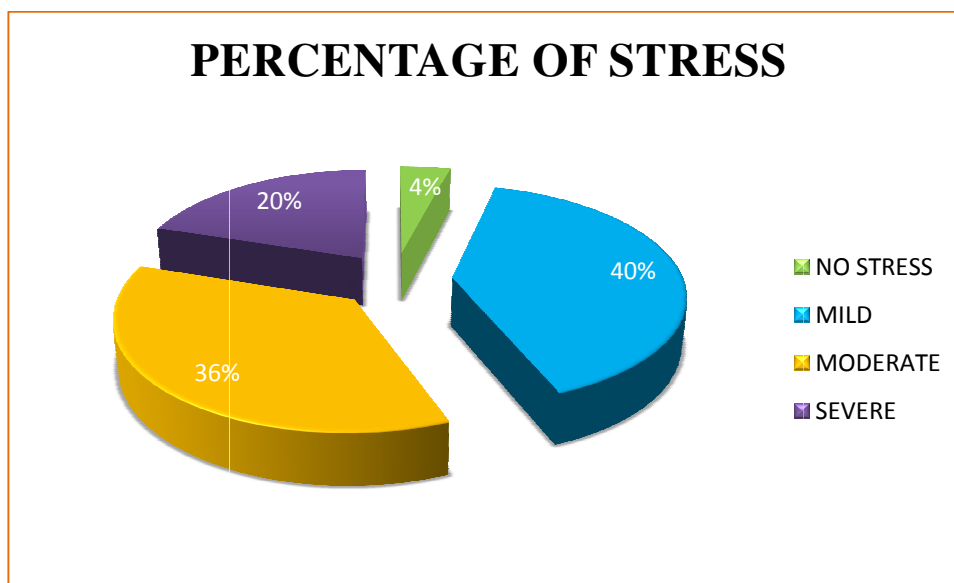
## CO MORBIDITIES



**Figure No 5: The distribution of Co-morbidities in patient with hypertension.**

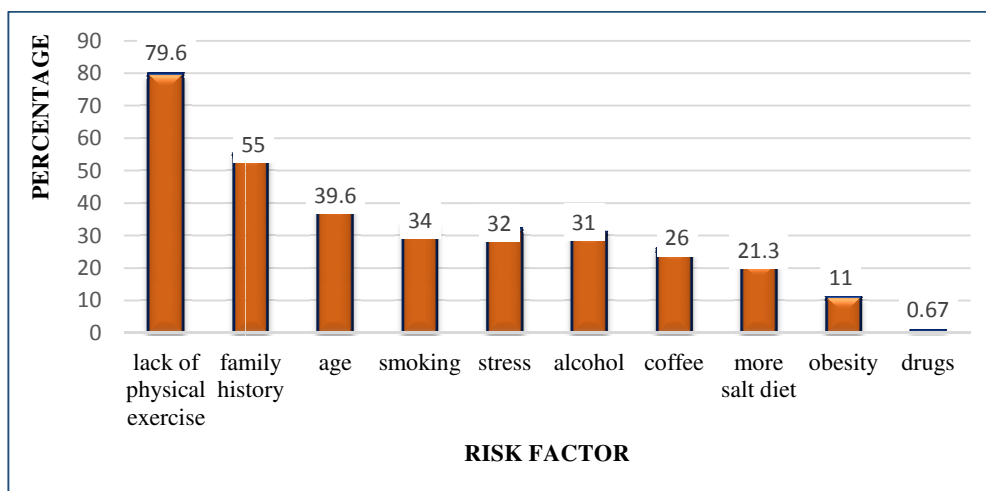
Figure 5 shows that among 100 hypertensive patients in the study, the Co morbidities such as Diabetes, Angina and Asthma make a value of more than 30% and the remaining as follows and the least observed is Arrhythmia with an overall of 8%. However, in the study of Sabina et al, Depression got a higher value of 44% followed by others and the least is Bipolar Disorder, 7%.

## PERCENTAGE STRESS



**Figure No 6: Frequency and distribution of stress in hypertensive patients**

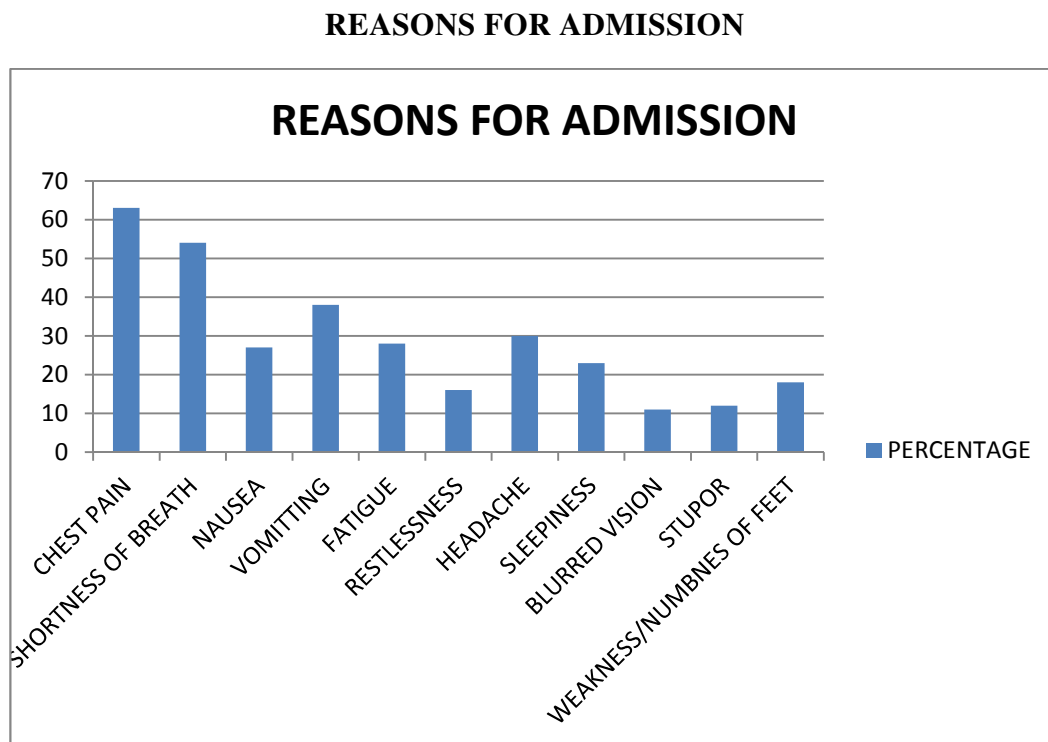
Figure 6 shows reveals that among 100 hypertensive patients enrolled in the study, ne mild stress on 40% followed by moderate stress 36%. The patient those having severe stress come up to 20% and only remaining 5% having no symptoms.

**RISK FACTOR ASSESSMENT OF HYPERTENSION**

**Figure No 7: Frequency and percentage of risk factor assessment of Hypertension**

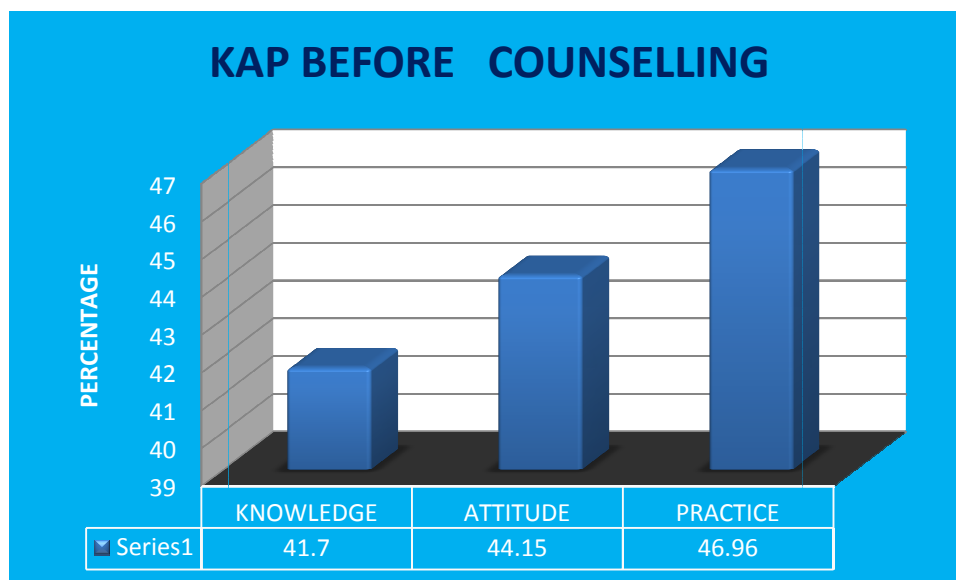
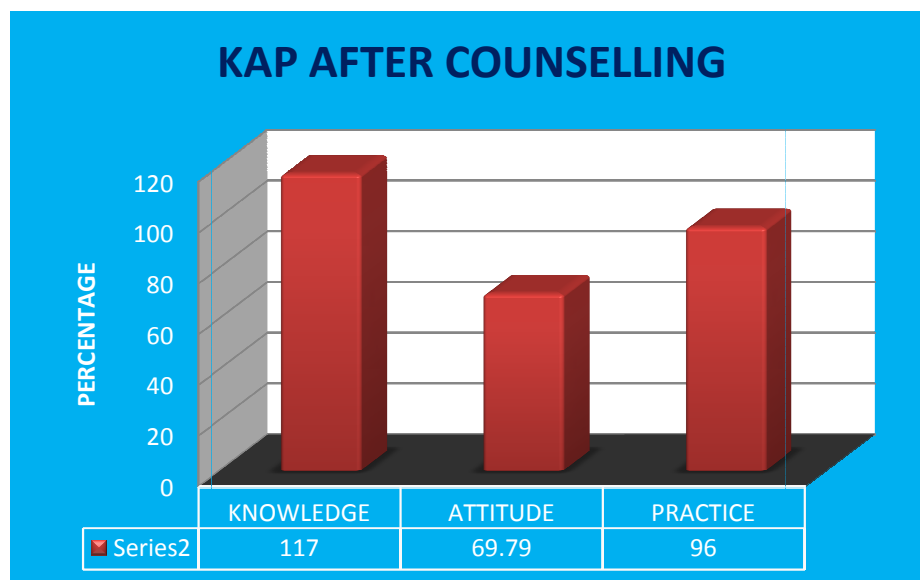
Figure 7 shows that among 100 hypertensive patients in the study, more than half i.e. 79.6% have the risk factor of lack of physical exercise followed by family history (55%), age (39.6%) and least risk factor observed for the risk factor of hypertension due to drugs i.e. 0.67%.





**Figure No 8: Percentage of reason for admission in hypertensive patients.**

The figure 8 shows that from 100 hypertensive patients, most commonly found reason for admission was chest pain, 63% followed by shortness of breath 54% and the least occurred was blurred vision with an approximate value of 11%.

**KNOWLEDGE, ATTITUDE AND PRACTICE****KAP BEFORE COUNSELLING****KAP AFTER COUNSELLING**

**KNOWLEDGE, ATTITUDE AND PRACTICE**

T TEST			
	K_AF - K_BF	A_AF - A_BF	P_AF - P_BF
T	19.45	15.54	20.64
P	<0.0001	<0.0001	<0.0001

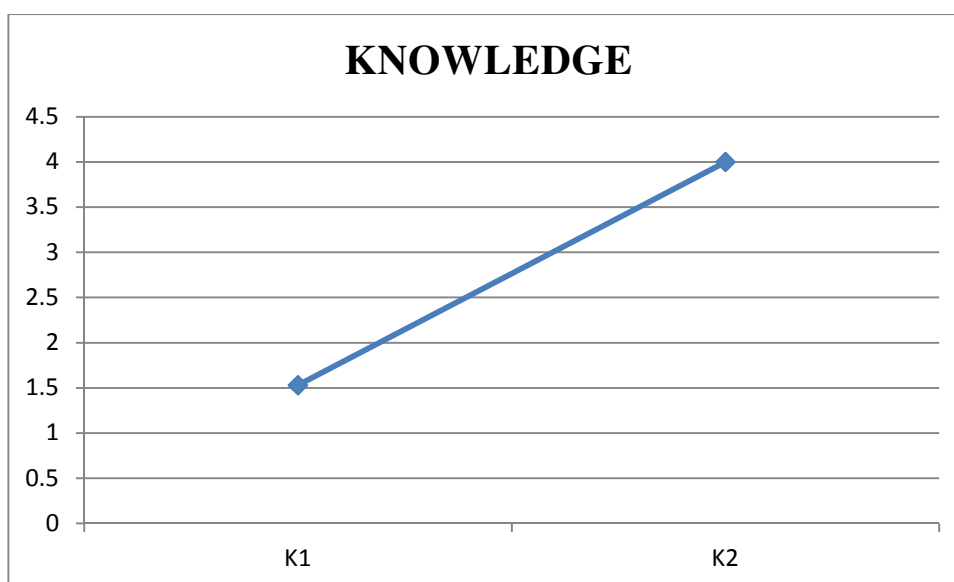
**KNOWLEDGE**

Figure above shows the Knowledge, before and after counselling of the hypertensive patients. The K1 and K2 are the knowledge before and after counselling respectively. From this graph, we can understand that the knowledge of the patients was improved greatly after counselling.

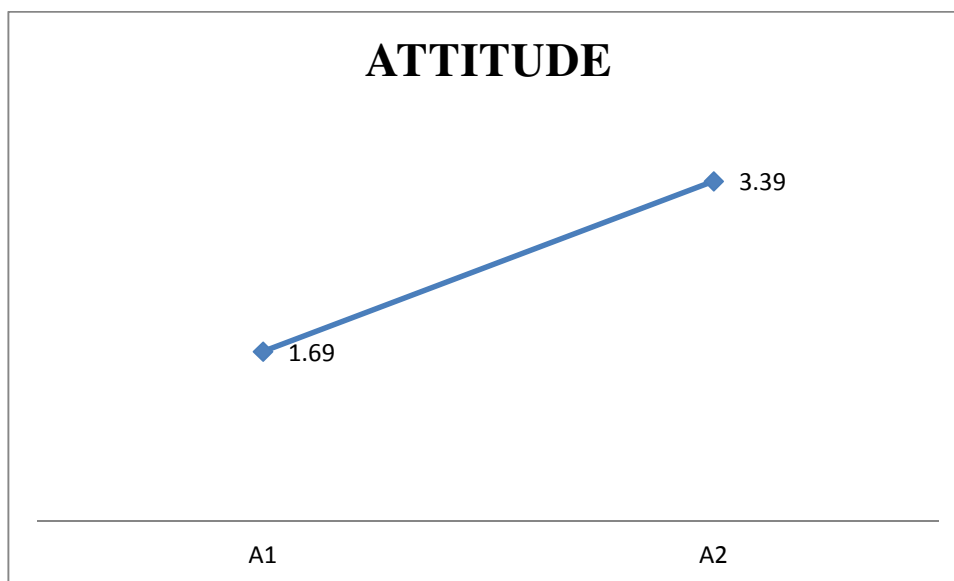
**ATTITUDE**

Figure above shows the Attitude, before and after counselling of the hypertensive patients. The A1 and A2 are the attitude before and after counselling respectively. From this graph, we can understand that the attitude of the patients was improved greatly after counselling.

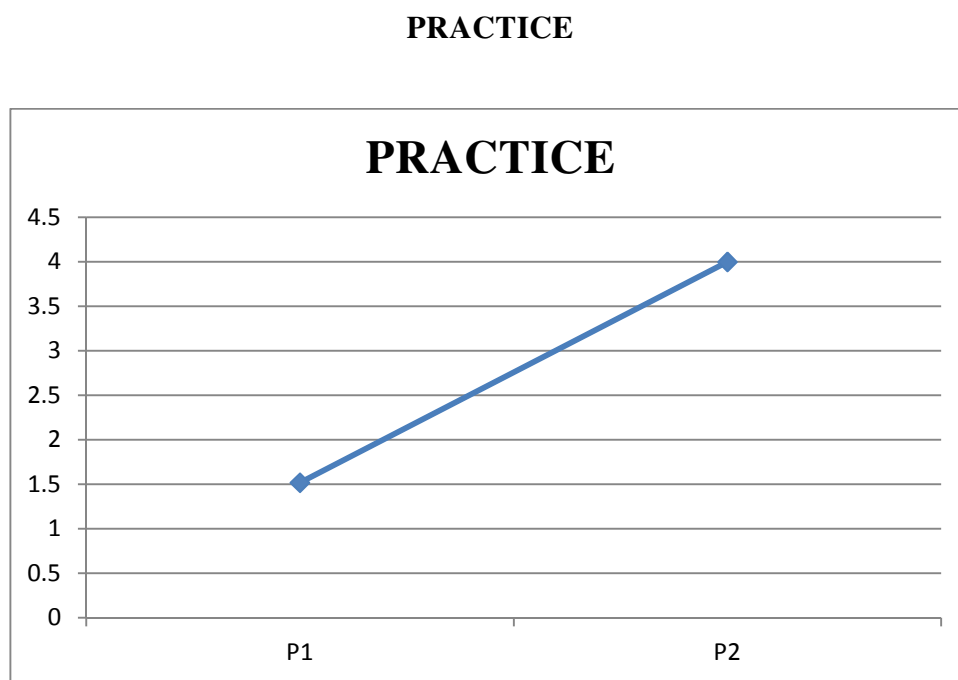


Figure above shows the practice, before and after counselling of the hypertensive patients. The P1 and P2 are the practice before and after counselling respectively. From this graph, we can understand that the practice of the patients are improved greatly after counselling.

## DISCUSSION

In our study of 100 hypertensive patients, most of the patients were in the age group of 61-80yrs, 52% followed by 41-60yrs of age, i.e. 43% and the least were in the category of 20-40% i.e. 2%. However in the study of Rakumakoe M.D., the largest number of respondents fell in the 50-59 age group (28%).in this study. Moreover, the study of Qisthi D, et. al., the characteristics of sex and age of respondents, both groups were dominated by female respondents and 50–59 years old aged. There were more aging respondents commonly found reason for admission was chest pain, 63% followed by shortness of breath 54% and the least occurred was blurred vision with an approximate value of 11%. However the study done by WHO et al also shows that the common symptoms of hypertension is head ache 40% followed by chest pain 30% and shortness of breath 10%.

Among 100 hypertensive patients in the study, the Co morbidities such as Diabetes, Angina and Asthma make a value of more than 30% and the remaining as follows and the least observed is Arrhythmia with an overall of 8%. However, in the study of Sabina et al, Depression got a higher value of 44% followed by others and the least is Bipolar Disorder, 7%. Similarly in the study of Okeke C. et al the more no of patient are suffering from Diabetes, 33.5% followed by Chronic Kidney Disease 32.5% and Heart disease 24%.

Since the P value  $<0.0001$ , the study is clinically significant. That means there is a significant difference between knowledge, attitude and practice of the people before and after patient counselling. Similarly in the study of Rashidi Y. et.al. P  $<0.001$ , knowledge, attitude and practice of the people before and after

patient counselling are significant. However in the study of Qsthi D. et. al. P value obtained in this study was 0.676 ( $P > 0.05$ ). It means there was no any difference in the level of knowledge in hypertension between both groups. Both of groups had moderate level of knowledge about hypertension. But in the hypertensive group, there were fewer respondents with poor level of knowledge than in non-hypertensive group who also had poor level of knowledge about hypertension.

There is need for encouraging health services including health education targeting various risk factors and promotion of regular physical exercise. The health workers have to play part by educating the people and also themselves being an example in avoiding the risk factors for HTN like consumption of fatty foods, alcohol and smoking. People have to be educated on the importance of physical exercises and have to be encourage to do them. In our study KAP can be assessed by providing the KAP questionnaire before and after patient counselling to individual patient and the Z value was found to be -12.549, -11.656 & -11.751 for K, A&P respectively. The P value was found to be 0.000, 0.000 & 0.000 for K, A& P respectively [Table.4]. Since the P value  $< 0.05$ . So the study is significant. It was also assessed from figure of knowledge, attitude and practice. We concluded that through effective clinical pharmacist intervention the knowledge, attitude and practice were improved after patient counselling. Similar result can be seen in a study conducted by Aubert et al and the p value was found to be  $< 0.001$ .<sup>[16]</sup>

## CONCLUSION

The study is used to assess the age group and the sex of the respondents involved in the study. There by finding out the most common reason of admission of the Hypertensive patients i.e. chest pain followed by headache. The most commonly seen co- morbidity in patient with hypertension is Diabetes followed by chronic kidney Disease.

The knowledge, attitude and practice of Hypertensive patient before and after patient counselling were assessed it shows there is a marked improvement in KAP scores when we are comparing KAP score on before counselling will KAP score on after counselling found that patient counselling have great impact in improving patient understanding about the disease.



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**DATA COLLECTION FORM****PATIENT DEMOGRAPHICS**

NAME	AGE:	SEX:
WEIGHT:	HEIGHT:	BMI:
ETHNICITY:	EDUCATIONAL QUALIFICATION:	
ECONOMIC STATUS:		

**REASON FOR ADMISSIONS**

<input type="checkbox"/> CHEST PAIN	<input type="checkbox"/> SHORTNESS OF BREATH	<input type="checkbox"/> NAUSEA
<input type="checkbox"/> VOMITTING	<input type="checkbox"/> FATIGUE	<input type="checkbox"/> RESTLESSNESS
<input type="checkbox"/> HEADACHE	<input type="checkbox"/> SLEEPINESS	<input type="checkbox"/> BLURRED VISION
<input type="checkbox"/> STUPOR	<input type="checkbox"/> WEAKNESS OR NUMBNESS OF FEET	

**PAST MEDICAL HISTORY**

<input type="checkbox"/> DIABETES	<input type="checkbox"/> CHRONIC KIDNEY DISEASE	<input type="checkbox"/> MI
<input type="checkbox"/> HEART FAILURE	<input type="checkbox"/> ANGINA	<input type="checkbox"/> ARRHYTHMIA
<input type="checkbox"/> ASTHMA	<input type="checkbox"/> STROKE	<input type="checkbox"/> DVT
<input type="checkbox"/> CHRONIC LIVER FAILURE	<input type="checkbox"/> RESPIRATORY FAILURE	

**PAST MEDICATION HISTORY**

--

**CLINICAL VALUES**

BP:	PULSE:	HR:
CVS:	HEENT:	GIT:
GUT:		

**LABORATORY PARAMETERS**

<b><u>HAEMATOLOGY</u></b>	<b><u>LFT</u></b>	<b><u>LIPID PROFILE</u></b>
Hb:	T.BILIRUBIN:	TOTAL CHL:
RBC:	ALBUMIN:	LDL:
TC:	SGOT:	VLDL:
PLT:	SGPT:	HDL:
ESR:	ALT:	TGL:
<b><u>RENAL</u></b>		
S.CR:		
UREA:		

**DRUG CHART**

--



## PERCEIVED STRESS SCALE

### SHELDON COHEN

The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The PSS was designed for use in community samples with at least a junior high school education. The items are easy to understand, and the response alternatives are simple to grasp.

Moreover, the questions are of a general nature and hence are relatively free of content specific to any subpopulation group. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way.

#### Evidence for Validity:

Higher PSS scores were associated with (for example):

- ☐ Failure to quit smoking
- ☐ Failure among diabetics to control blood sugar levels
- ☐ Greater vulnerability to stressful life-event-elicited depressive symptoms
- ☐ More colds

#### Health status relationship to PSS:

Cohen et al. (1988) show correlations with PSS and: Stress Measures, Self-Reported Health and Health Services Measures, Health Behaviour Measures, Smoking Status, Help Seeking Behaviour.

#### Temporal Nature:

Because levels of appraised stress should be influenced by daily hassles, major events, and changes in coping resources, predictive validity of the PSS is expected to fall off rapidly after four to eight weeks.

#### Scoring:

PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale.

## COHEN PERCEIVED STRESS SCALE

Name:

Date:

Age:

Sex:

IP NO:

Sl. No	QUESTIONS	Never	Almost Never	Sometimes	Fairly Often	Very Often	Score
1.	In the last month, how often you have been upset because of something that happened unexpectedly?						
2.	In the last month, how often have you were unable to control the important things in your life?						
	In the last month, how often you felt nervous and stressed?						
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?						
5.	In the last month, how often have you felt that things were going your way?						
6.	In the last month, how often have you found that you could not cope with all the things that you have to do?						
7.	In the last month, how often have you been able to control irritations in your life?						
8.	In the last month, how often have you felt that you were on top of things?						
9.	In the last month, how often have you angered because of things that were outside of your control?						
10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?						
<b>TOTAL</b>							

## KAP QUESTIONNAIRE

### KNOWLEDGE

SL. NO.	QUESTION	BEFORE	PATIENT COUNSELLING	AFTER
1	What means High Blood pressure?			
2	Are you aware of the risk factors of hypertension?			
3	Do you know what the normal blood pressure level is?			
4	Are you familiar with the hypertension complications?			
5	Mention any few lifestyle measures to prevent hypertension?			

### ATTITUDE

SL.NO.	QUESTION	BEFORE	PATIENT COUNSELLING	AFTER
1	Do you think hypertension curable?			
2	Do you believe hypertension can be controlled by life style modification?			
3	Do you willing to take medication regularly?			
4	Do you believe that hypertension only occur in rich people?			
5	Are you agree to the fact that hypertension is genetic?			

### PRACTICE

SL.NO	QUESTION	BEFORE	PATIENT COUNSELLING	AFTER
1	Are you exercising regularly?			
2	Are you limiting your salt intake?			
3	Do you eat fresh vegetable and small fish?			
4	Are you willing to limit Alcohol?			
5	Are you ready to quit smoking?			